NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

AN ANALYSIS OF ARMY PROGRAM MANAGEMENT OFFICE INSERTION INTO THE CENTRAL TEST AND EVALUATION INVESTMENT PROGRAM PROJECT SELECTION PROCESS

by

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December 2002

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13. ABSTRACT *(maximum 200 words)*

       The Central Test and Evaluation Investment Program (CTEIP) was established in 1990 by the Office of the Secretary of Defense (OSD), in response to Congressional direction, to provide a corporate investment approach to meeting Service and Defense Agency Test and Evaluation (T&E) needs. This approach to the allocation of test resources increases interoperability between the Services, and interconnectivity among the test centers and ranges. It serves to focus T&E expertise on test requirements that are of the highest priority. The CTEIP project selection process consists of a cyclic approach in which the Services and Defense Agencies solicit T&E needs, propose solutions to those needs, and then formally project proposals. Program Management Offices (PMOs) are not directly solicited for potential project solutions addressing direct operational test needs, yet, the PMOs are facing significantly reduced T&E funding. Knowledge of the CTEIP program and the proposal submission process should aid the PMOs in the planning and execution of their Operational Test Programs. This thesis reviews the CTEIP and evaluates the extent to which PMOs are involved in the submission of T&E needs, and the value of PMO involvement in CTEIP project selection process.

14. SUBJECT TERMS Test and Evaluation, T&E, CTEIP, T&E Investments, Program Management Office, PMO, TEMA, DOT&E, Funding, Operational Testing, Requirements, Test Needs, T&E Planning			15. NUMBER OF PAGES 79
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requirements for the degree of

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ABSTRACT

The Central Test and Evaluation Investment Program (CTEIP) was established in 1990 by the Office of the Secretary of Defense (OSD), in response to Congressional direction, to provide a corporate investment approach to meeting Service and Defense Agency Test and Evaluation (T&E) needs. This approach to the allocation of test resources increases interoperability between the Services, and interconnectivity among the test centers and ranges. It serves to focus T&E expertise on test requirements that are of the highest priority. The CTEIP project selection process consists of a cyclic approach in which the Services and Defense Agencies solicit T&E needs, propose solutions to those needs, and then formally project proposals. Program Management Offices (PMOs) are not directly solicited for potential project solutions addressing direct operational test needs, yet, the PMOs are facing significantly reduced T&E funding. Knowledge of the CTEIP program and the proposal submission process should aid the PMOs in the planning and execution of their Operational Test Programs. This thesis reviews the CTEIP and evaluates the extent to which PMOs are involved in the submission of T&E needs, and the value of PMO involvement in CTEIP project selection process.

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I. INTRODUCTION

A. PURPOSE

This thesis reviews the Central Test and Evaluation Investment Program (CTEIP) and evaluates the extent to which Program Management Offices (PMO) are involved in the submission of test and evaluation needs, from which CTEIP projects are selected. The objective is to determine if the CTEIP managers for potential projects directly or indirectly solicit PMOs, and how the PMOs can more directly insert themselves into the project selection process. Data is gathered to determine if there is value added for the PMOs to participate in CTEIP. The research includes conducting a detailed review of the CTEIP selection process and participating organizations, and conducting a series of telephone and personal interviews with PMO Test Division Chiefs and Team Leads as to their knowledge of CTEIP and solicitations they have participated in regarding Test and Evaluation (T&E) needs.

B. BACKGROUND

The CTEIP was established in 1990 by the Office of the Secretary of Defense (OSD), in response to Congressional direction, to provide a corporate investment approach to meeting Service and Defense Agency T&E needs. This approach to the allocation of test resources increases interoperability between the Services, and interconnectivity among the test centers and ranges. It serves to focus T&E expertise on test requirements that are of the highest priority. The CTEIP charter also promotes joint initiatives and elimination of unwarranted duplication of effort. Three foundation criteria for CTEIP projects were established by Congressional language: must have multi-service applicability; must be developmental in nature; and must not be used for procurement.

Oversight of the CTEIP projects resides within the Office of the Director, Operational Test and Evaluation (DOT&E). The CTEIP project selection process consists of a cyclic approach in which the Services and Defense Agencies solicit T&E needs, propose solutions to those needs, and then formally project proposals. Each stage of the process requires review, analysis, and prioritization of the proposals in order to determine the areas of overall T&E priorities within the Services and defense agencies. Typically, solicitations for these proposals are addressed within the Service and Defense

Agency T&E organizations, with the only input from PMOs coming from comments included in Test and Evaluation Management Plans (TEMPs). The CTEIP management does not directly solicit PMOs for potential project solutions addressing direct operational test needs.

However, PMOs are facing significantly reduced T&E funding. Knowledge of the CTEIP program and the proposal submission process can aid the PMOs in the planning and execution of their Operational Test Programs. An analysis of the total CTEIP program is conducted within this research to establish the most efficient means of inserting PMO's proposals into the CTEIP project planning process.

C.   THESIS OBJECTIVES

The benefits of this study are intended to be two-fold. First, a review of the CTEIP project selection process to determine the extent to which PMOs are involved will be helpful to the CTEIP managers for future planning. Secondly, a review of the CTEIP project selection process will help clarify the process for PMO test leads and will better define the path a PMO needs to take to submit a proposal for acceptance as a CTEIP funded program. This process is currently not clear for PMO test leads to follow successfully without prior experience within the CTEIP process. Guidance for PMOs will be developed to aid them in their CTEIP funding quests.

D.   RESEARCH QUESTIONS

1.   Primary Research Questions

- How can a Program Management Office (PMO) become aware of the availability and applicability of Central Test and Evaluation Investment Program (CTEIP) funding for their test programs?

- Would funding from CTEIP be of value to the PMO's test program?

- How can a Program Management Office insert themselves into the CTEIP needs and solution process in order to obtain funding for test program developments?

2.   Secondary Research Question

- What are some potential strategies that the CTEIP managers could use to educate and offer assistance to PMO personnel?

E.   SCOPE AND LIMITATIONS

This thesis examines the challenges faced by PMO Test Leads as they prepare and submit project proposals for CTEIP funding consideration. U. S. Army PMO Test Leads,

primarily from the U.S. Army Aviation and Missile Command and associated Program Executive Office PMOs, are the focus group for telephone interviews concerning their knowledge of and participation in CTEIP activities to date. Discussions with other service PMO Test Leads will be limited. The CTEIP management organization within OSD will be contacted. The information gained from interviews with OSD personnel and the information gained from CTEIP documentation will serve as the baseline for the current CTEIP proposal submission process and selection criteria.

F. METHODOLOGY

1. Data Collection Methodology

The research for this thesis was accomplished in three ways. Initially, a comprehensive literature search was conducted in which information pertaining to CTEIP policy, execution guides, reports, briefings, and Congressional language was reviewed and analyzed. Inherent in the documentation procured through the literature search was information on the roles and responsibilities of the CTEIP management, the CTEIP project selection process, and a review of CTEIP projects over the last five years as to their origin and sponsorship. Next, interviews were conducted with PMO Test Division Chiefs and T&E Team Leads to determine the extent to which they had knowledge of CTEIP, had participated in CTEIP project selection processes, or had communicated with other organizations managing a CTEIP project. These PMO personnel were also questioned as to what value they would gain with CTEIP funding for portions of their test program. Finally, CTEIP management officials were interviewed to determine the extent to which they actively solicit test needs directly from PMOs, and the value they would place on a more interactive participation by PMOs.

G. THESIS ORGANIZATION

The thesis is organized into six chapters.

Chapter I: <u>Introduction</u>. This chapter presents the purpose, background, objective, research questions, scope and limitations, methodology, and organization of the thesis.

Chapter II: <u>CTEIP Overview</u>. In this chapter, an overview of the CTEIP is presented to include its origin, purpose, and program objectives. The CTEIP

management organization and program structure and planning process is also discussed. Finally, other Army organizations that participate in the CTEIP process are presented.

Chapter III: Data Presentation. This chapter presents a review of the Test Investment Process for the total test community, CTEIP, and each of the CTEIP projects. Interviews were conducted with PMO Test Division Chiefs and Team Leads as to their knowledge of CTEIP. Finally, CTEIP management organization representatives were interviewed as to their source of CTEIP proposals and their solicitation of PMOs for CTEIP projects.

Chapter IV: Data Analysis. Analysis was conducted on the data collected in Chapter III. This analysis provides insight into the CTEIP project selection process; the value of CTEIP to PMO, and their knowledge of its existence; and the manner in which the CTEIP management focuses their project solicitation process.

Chapter VI: Conclusions and Recommendations. This chapter presents conclusions and recommendations for both PMOs and the CTEIP management. The answers to the research questions are given. Also found in this chapter are several ideas for further areas of study relating to this thesis.

II. CTEIP PROGRAM OVERVIEW

A. PROGRAM BEGINNINGS

Prior to 1989, the Office of the Secretary of Defense (OSD) was seeking a way to enhance their oversight and management of the Department of Defense (DoD) Test and Evaluation (T&E) capability base. This quest was a result of Congressional direction to improve the way investments were planned and coordinated in T&E facilities. The Central Test and Evaluation Investment Program (CTEIP) was established in 1990. It was given the Program Element 0604940D. [Ref. 1:p. 1]

B. PROGRAM BACKGROUND

The CTEIP was established and first funded in fiscal year (FY) 1991 under the sponsorship and oversight of the Deputy Director, Defense Research and Engineering (Test and Evaluation) (DDDR&E (T&E)). Reorganization in 1992 changed the DDDR&E (T&E) to the Director, Test and Evaluation (DT&E) in the Office of the Under Secretary of Defense (Acquisition) (OUSD (A)). An organizational change occurred again in 1994 to establish the Office of the Director, Test Systems Engineering and Evaluation (DTSE&E), in the Office of the Under Secretary of Defense (Acquisition and Technology) (OUSD (A&T)). In 1999, another realignment took place that transferred T&E functions from OUSD (A&T) to the Director, Operational Test and Evaluation (DOT&E). [Ref. 2:p. 1]

The CTEIP has a funding level of approximately $125 million per year. [Ref. 3:p. 3]. This funding is divided among three separately managed projects. The subprojects of the Joint Improvement and Modernization (JIM) project comprise approximately seventy-five per cent of the total yearly funding. The Test Technology Development and Demonstration (TTD&D) subprojects make up approximately five per cent of the total yearly funding. Each TTD&D subproject is limited to under $500 thousand per year. The Resource Enhancement Projects (REP) subprojects are approximately twenty per cent of the total yearly CTEIP funding. [Ref. 4:p. 5].

Three main criteria for CTEIP projects were established directly from Congressional language. To be considered for CTEIP funding a project must have multi-

Service applicability; must be developmental in nature; and must not be used for procurement. [Ref. 1:p. 1]

C. CTEIP PROGRAM PURPOSE AND STRUCTURE

The CTEIP was established with several main objectives. Some of these objectives are applicable to all three of the CTEIP sub-projects. Each of these projects, JIM, TTD&D, and REP, has a distinct purpose, management structure, selection criteria and execution guidance within the confines of the overall CTEIP. This section describes the major features of each of the CTEIP projects. [Ref. 1:p. 2]
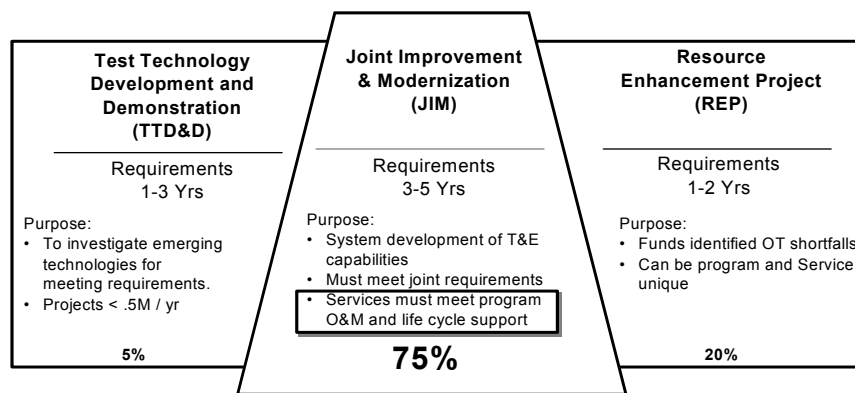
Figure 2.1.   CTEIP Project Categories. [From: Ref. 3:p. 9]
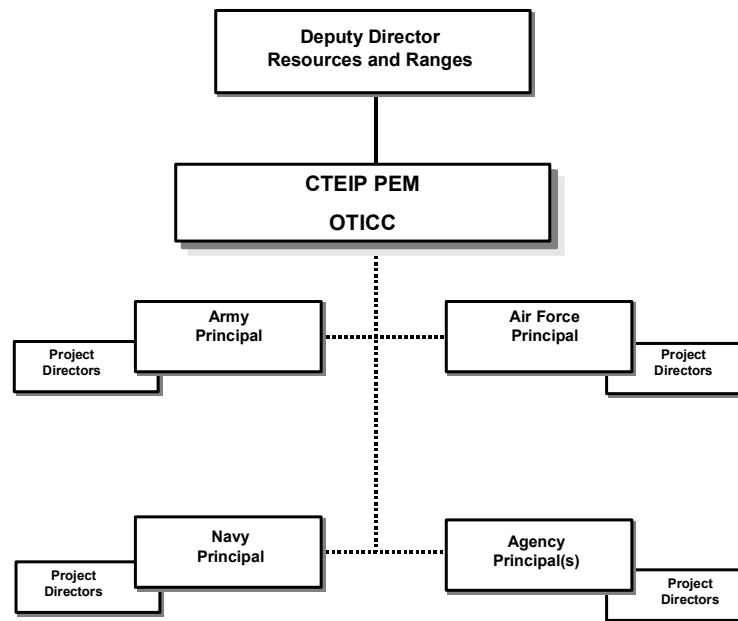
Figure 2.2.   JIM Management Structure. [From: Ref. 3:p. 10]

1.   Joint Improvement and Modernization (JIM) Project

a.   Project Description and Objectives

The JIM Project is most concerned with the long-term T&E infrastructure investments. As such, the sub-projects in this area must utilize the state-of-the-art in T&E technologies to address specific known deficiencies in the DoD T&E capabilities. The improvement of interoperability and interconnectivity of test assets across test centers, ranges, and facilities is imperative to maximize an efficient inter-service use of the test assets.   The reduction of T&E manpower, maintenance requirements and operating expenses is of prime importance in this time of a downsized workforce. To accomplish this, ongoing T&E technology development programs must be established and maintained to investigate areas of advanced technologies that could be applied to T&E to add technical capability and value. Targets, test instrumentation, and threat simulators are important parts of the T&E infrastructure and consistency, commonality, and interoperability of these assets must be achieved across the services. Modeling and simulation is becoming an integral piece of T&E and must be developed, validated, and integrated with open-air testing in order to provide timely, accurate, and cost-effective

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results. Mobile test instrumentation should be promoted where economically and technically feasible as an alternative to fixed facilities. Resources should be available to fund shortfalls in critical near-term operational test capabilities. Past JIM projects have addressed such issues as automated data collection, processing, display, and archiving; smart munitions testing; simulation and end-game measurement; testing applications of advanced materials; test design; advanced sensors; and space systems. [Ref. 1:p. 2]

The JIM subprojects comprise seventy-five percent of the total CTEIP yearly funding [Ref. 4:p. 5]. The JIM subprojects are usually multi-phase in nature with a developmental time of approximately three to five years. The subprojects must meet stringent criteria for joint requirements. [Ref. 1:p. 7]

The CTEIP JIM projects are categorized by functional areas consistent with the Reliance areas used to group test capabilities throughout DoD. The areas are: Air Combat; Land Combat; Sea Combat; Space Combat; Common Range Instrumentation; Electronic Combat; Armament and Munitions; Targets; Test Environments; and Command, Control, Communications, Computers, and Intelligence (C4I). [Ref. 1:pp. 3-4]

b.   Management Approach

The CTEIP Program Element Manager (PEM) confirms, with preparation of a Test Package Directive (TPD), which service or Defense Agency will be responsible for the project execution of the JIM project. The CTEIP PEM and the OSD Test Investment Coordinating Committee (OTICC) retain management oversight of the JIM project throughout its development. The day-to-day project management is left to the executing agency and an individually named Project Director (PD). Project progress is monitored thorough the submission of monthly status reports, Internal Program Reviews as necessary or requested by the (OTICC), and annual Mid-Year Review briefings. Deviations from the approved Program Management Plan (PMP) must have approval from the CTEIP PEM and the OTICC. [Refs. 1 and 7]

2.   Test Technology Development & Demonstration (TTD&D)

a.   Project Description

TTD&D projects facilitate the transition of technology as it matures from the laboratories to the T&E communities. This transition enhances test capabilities and

reduces the technical risk of testing future defense systems. Through these subprojects, equipment and methods are provided to the T&E community to evaluate new weapon systems that evolve from advanced research and development initiatives. The goals and objectives of the projects are reviewed annually to ensure that the strategic areas of interest are being addressed. [Ref. 5:p. 1] Yearly reviews of the projects ensure they match the strategic thrust areas. The review also ensures that the projects support DoD guidance and policy as published in the Defense Technology Area Plan. The subprojects selected for TTD&D projects are expected to be available for transition to fielded technology within three years. The funding level is limited to less than $500,000 per year. [Ref. 5:p. 1-2]

b.   *Management Approach*

The TTD&D is a centrally planned and funded project with decentralized execution. The CTEIP PEM serves as the Executive Secretary of the OTICC. The CTEIP PEM issues policy guidelines and direction; approves the yearly funding; issues the TPD for project execution; and designates a TTD&D PD to oversee the day-to-day activities. All this is under the continual oversight of the OTICC and DOT&E. [Ref. 5:p. 2-1] The TTD&D PD manages the day-to-day operations of the project; develops the PMP for submission and approval by the CTEIP PEM; coordinates any necessary subproject nomination, evaluation and selection process; develops and manages to the funding profile and spend plan; prepares an overall Annual Assessment Report; conducts reviews; and prepares a yearly project status briefing at the CTEIP Mid-Year Review. [Ref. 5:p. 2-2]

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                    │   CTEIP PEM/    │
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                    │ Project Director│
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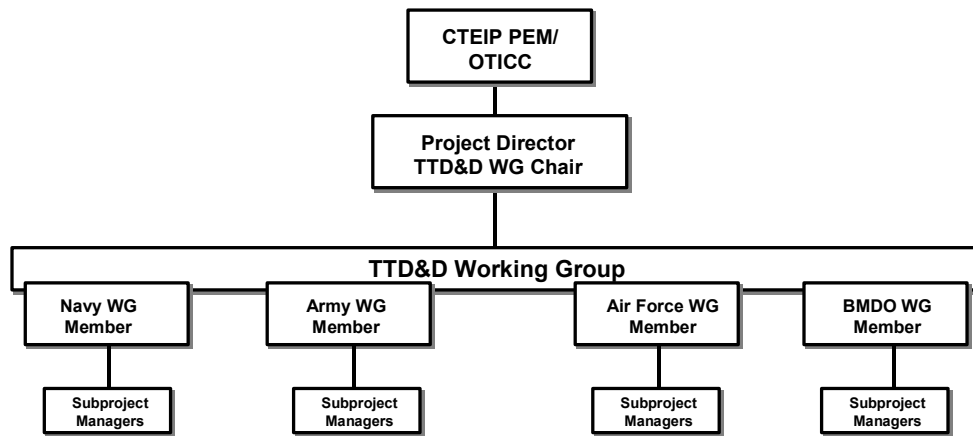
Figure 2.3.   TTD&D Management Structure. [From: Ref. 3:p. 12]

3.   Resource Enhancement Project (REP)

a.   Project Description

REP has the main objective of ensuring that acquisition programs in the services and DoD agencies have the resources necessary to test in the most realistic environment available. [Ref. 2:p. 1-1]   The main focus of the REP funds is to answer operational test requirements that will be needed within three years or less, that are high priority, and that were not programmed by the program office or by POM submissions. These near term requirements are usually a result of changes in the test requirements, scope of testing, or other program changes that affect testing.   The development and evaluation of the weapon systems and system upgrades become high risk without these additional Operational Test (OT) resources.   The REP provides a more rapid response to unforeseen issues and unplanned test needs than the other CTEIP projects. [Ref. 2:p. 1-1] However, the shorter development time is more limiting to the scope of the projects if they are to be available as an OT test asset or capability.

b. *Management Approach*

REP subprojects are reviewed, analyzed, and prioritized by the REP Working Group (WG) and then submitted through the CTEIP PEM to the Deputy Director, Resources Ranges (DDR&R) and the OTICC. The REP WG consists of the WG Chairman and a primary and alternative representative from the Army, Navy, Air Force, and Marine Corps. Also represented on the REP WG are the Joint Interoperability Test Command (JITC) Operational Test Agencies (OTAs), Ballistic Missile Defense Organization (now known as the Missile Defense Agency (MDA)), and the Defense Intelligence Agency (DIA). Voting rights are given only to those representatives from an OTA. The day-to-day management of the individual REP is assigned to a service or defense agency field level organization. A subproject manager, an alternate, and a financial manager are named. Normal communications flow through the CTEIP PEM to the REP WG Chairman. It then goes to the REP WG members, and down the chain of command to the subproject manager at the field level. The communications reverse to flow up the chain of command. [Ref. 2:pp. 2-3 to 2-4] The key management document for REP subprojects is the Quad Chart. It provides a detailed subproject description; identifies individuals and organizations; and shows key milestones, funding sources, and the funding stream. [Ref. 2:p. 3-4]
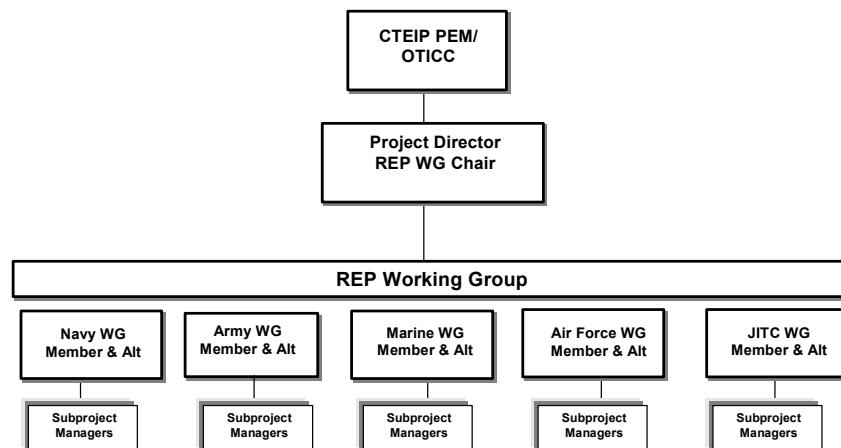
Figure 2.4.   REP Management Structure. [From: Ref. 3:p. 11]

D. CTEIP RELATED ORGANIZATIONS

Many organizations have either direct oversight responsibility, indirect oversight responsibility, or direct execution responsibility for the three CTEIP project areas.

1. Director, Operation Test and Evaluation (DOT&E)

The DOT&E is functionally assigned to the Office of the Secretary of Defense (OSD). He serves as the principal staff assistant and senior advisor on matters related to Operational Test and Evaluation (OT&E) and Live Fire Test and Evaluation (LFT&E). DOT&E issues policy and procedures for DoD OT&E and LFT&E; reviews and analyzes the results of testing conducted for each major DoD acquisition program; and provides independent assessments to the Secretary of Defense, the Under Secretary of Defense for Acquisition Technology, and Logistics (USD (AT&L)) and Congress. DOT&E is responsible for budgetary recommendations regarding OT&E to ensure that the OT&E and LFT&E for major acquisition programs are planned so that the operational effectiveness, suitability, vulnerability, and lethality in combat use are tested properly. DOT&E was also given the oversight of the DoD's Major Range and Test Facility Base (MRTFB) as well as the oversight of the development of test resources such as instrumentation, targets, and other threat simulators. This includes the modeling and simulation infrastructure. CTEIP Program Element 0604940D is directly managed under DOT&E by the Deputy Director, Resources and Ranges. [Ref. 1:p. A-1]

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    │     Director,    │          │ Under Secretary of Defense│
    │    Operational   │          │           For            │
    │ Test and Evaluation│        │ Acquisition, Technology,  │
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| Deputy Director, C3I and Strategic Systems | Deputy Director, Conventional Systems | Deputy Director, Live Fire Test and Evaluation | Deputy Director, Resources and Ranges |
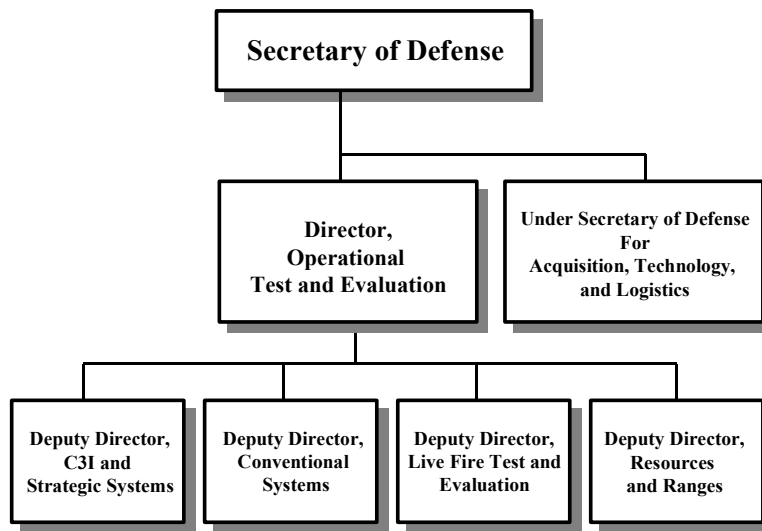
Figure 2.5.   DOT&E Organizational Chart. [After: Ref. 1:p. A-1].

2.   Defense Test and Training Steering Group (DTTSG)

The DTTSG oversees the integration of all training and test range instrumentation and the development of requirements to facilitate a consolidated acquisition policy for training and test capabilities. Embedded test and training capabilities in weapons systems are included in this effort. The DDTSG is chartered to provide direction, policy, and guidance for all DoD development and acquisition programs for hardware simulators, emitters, software simulations, hybrid representations, and surrogates of threat weapon systems. The DTTSG is chaired by DOT&E. The Deputy Director for Resources and Ranges, DOT&E and the Director, Readiness and Training, Deputy Under Secretary of Defense (Readiness) are the Co-Executive Secretaries. The Steering Group itself is made up of members representing the offices of Deputy Under Secretary of Defense (Readiness); Deputy Under Secretary of Defense (Science and Technology); Deputy Director, Strategic and Tactical Systems (Developmental Test and Evaluation); Test and Evaluation Representatives from the Army, Navy, Air Force, and Marine Corps; Training Representatives from the Army, Navy, Air Force, and Marine Corps; Joint Chiefs of Staff, J-8; Defense Threat Reduction Agency; MDA; Defense Intelligence Agency; and Defense Information Systems Agency. [Ref. 1:p. A-1, 2].

3. OSD Test Investment Coordinating Committee (OTICC)

The OTICC was chartered in March, 2000 as a result of combining two of three original committees under the DTTSG. The committees that were combined were the Test and Evaluation Resource Committee (TERC) and the CROSSBOW Committee. The OTICC has a more direct role of oversight and management over the CTEIP. It functions to coordinate the working level activities through several formal working groups. Pertinent directly to the CTEIP oversight role are the Resource Enhancement Project Working Group and the Test Technology Development and Demonstration Working Group. The REP Working Group directly oversees the Operational Test subprojects executed under the REP. The TTD&D Working Group oversees the execution of the TTD&D subprojects. The OTICC Chair is the Deputy Director, Resources and Ranges. The CTEIP Program Element Manager (PEM) serves as the Executive Secretary. Membership on the OTICC is at the O-6/GM-15 level or above and are representatives from the offices of Assistant Director, Test and Evaluation Resources, Missile Defense Agency; Deputy Director for Resources, Test and Evaluation Management Agency, U.S. Army; Director of Test and Evaluation and Technology Requirements, T&E Infrastructure, U.S. Navy; Chief, Test and Evaluation Resources and Infrastructure Division, Test and Evaluation Directorate, U.S. Air Force; Marine Corps Operational Test and Evaluation Activity; NCR Liaison Officer, Joint Interoperability Test Command, Defense Information Systems Agency; Director for Special Weapon Technology, Testing Division Defense Threat Reduction Agency; Training Instrumentation Resource Investment Committee (TIRIC) (Executive Secretary); Threat Simulator Working Group (Chair); and the Director, Joint Program Office (T&E). [Ref. 1:p. A-2]
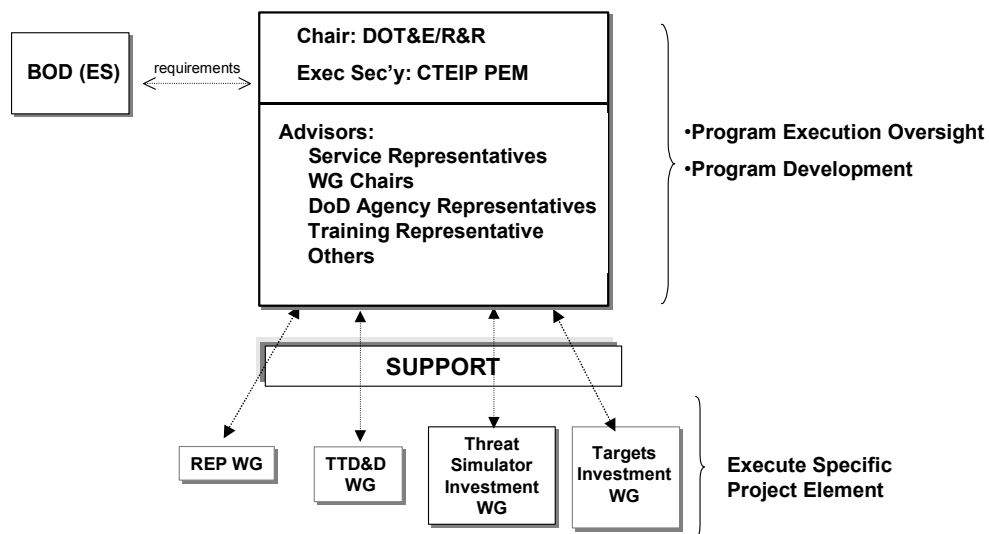
Figure 2.6.   OTICC Organization. [From: Ref. 3:p. 6].

4.   T&E Executive Agent (T&E EA)

The Service T&E Executive Agent was established in 1993. This organization provides the oversight to all of the Services RDT&E budgets for investments in test capabilities and for streamlining the T&E infrastructure. [Ref. 1:p. A-3]

a.   *The Board of Directors (BoD)*

The BoD is made up of all three Service Vice Chiefs of Staff and the DOT&E. The Assistant Commandant, U.S. Marine Corps, is a non-voting member. The Chair of the BoD is rotated among each of the Service Vice Chiefs and the DOT&E every two years. The mission of the BoD is to provide corporate guidance to the overall development of T&E investments without regard to Service or Defense Agency ownership. [Ref. 1:p. A-3]

b.   *The Board of Directors (Executive Secretariat) (BoD (ES))*

The BoD (ES) membership consists of all the T&E Principals among all the services. This includes the Deputy Under Secretary of the Army (Operations Research); the Director, Air Force Test and Evaluation; the Director, Test and Evaluation

and Technology Requirements, T&E Infrastructure, U.S. Navy; and the Deputy Director DOT&E (Resources and Ranges). The BoD (ES) reports directly to the BoD and the Chair is the T&E Principal from the same service as the BoD Chair. The Body (ES) acts as the agent to the BoD in implementing the T&E Reliance effort and guiding the T&E infrastructure investment and management policy. Approval of joint T&E requirements comes from the BoD(ES) as well as needs and solutions recommendations for CTEIP projects. [Ref. 1:p. A-3]
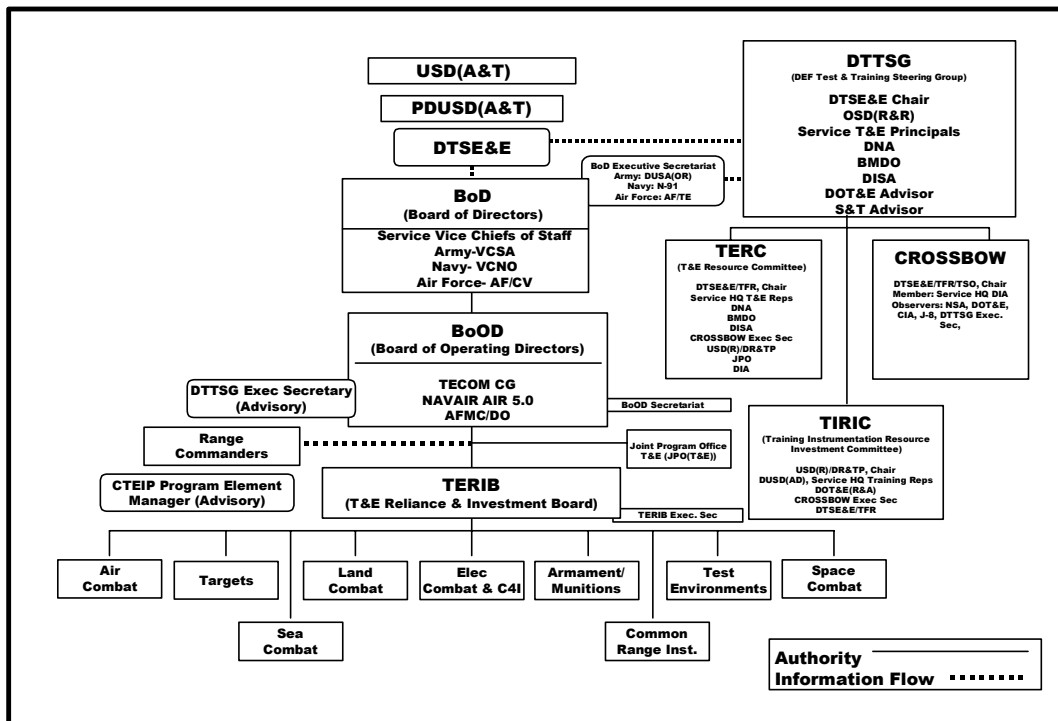
Figure 2.7.   T&E Executive Agent Structure. [After: Ref. 6]

c.   The Board of Directors (Executive Secretariat Staff) (BoD (ESS))

The BoD (ESS) is made up of representatives from the offices of the T&E Principals. The Chair is from the same Service as the BoD Chair. The Body (ESS) supports the efforts of the BOD (ES) in recommending T&E infrastructure investment guidance and management policy. The BoD (ESS) works closely with the Test Resource Advisory Group and has input into the CTEIP needs and solutions selection process. [Ref. 1:pp. A-3, 4]

d.   *Test Resource Advisory Group (TRAG)*

The TRAG is made up of the Commanding General, Developmental Test Command; Director of Operations, Air Force Materiel Command; Department of the Navy representative; and the Deputy Director, DOT&E, Resources and Ranges. The TRAG is chaired by a principal from a service or organization not chairing the BoD and the BoD (ES). The TRAG reports directly to the BoD (ES). The Director, Joint Program Office (T&E) serves as the Executive Secretary of the TRAG. The function of the TRAG is to implement the policies, decisions, and guidance of the T&E EA. The TRAG provides input into the CTEIP needs and solution selection process and offers recommendations on T&E infrastructure requirements and priorities. [Ref. 1:p. A-4]

e.   *The Joint Program Office for T&E (JPO (T&E))*

The JPO (T&E) is made up of DOT&E military, civilian, and contractor personnel. It is headed by a Senior Executive Service Director. The main function of the JPO (T&E) is to facilitate communication for the T&E EA in the areas of T&E infrastructure management and investment planning. [Ref. 1:p. A-4]

f.   *The T&E Reliance Structure*

To facilitate a more corporate-based means of investment planning, ten main areas of T&E have been identified and formed into multi-service Reliance Teams. Reliance Leads for each of the ten areas are designated and serve as the prime points of contact for efforts in their area across the services. The Reliance Leads coordinate all the service resource requirements within their area. The ten Reliance areas are Air Combat; Land Combat; Sea Combat; Space Combat; Common Range Instrumentation; Electronic Combat; Armaments and Munitions; Targets; Test Environments; and Command, Control, Communications, Computers, and Intelligence (C4I). The provisions for oversight of the Reliance areas are contained in joint-service memorandums of agreements (MOAs). [Ref. 1:p. A-4]

E.   U.S. ARMY T&E ORGANIZATIONS

The following organizations serve as the primary points of contact for Army PMOs in their pursuit of answers to T&E planning needs. While there are various service test agencies that should be consulted and included by the PMOs on any T&E Integrated Product Team, the agencies described below function at the headquarters and command

level and should be the first avenue taken by the PMOs to address T&E policy questions and T&E infrastructure and investment matters.

1.   U. S. Army Test and Evaluation Management Agency (TEMA)

The mission of TEMA is to develop and coordinate all Army T&E resource and policy actions with OSD, Army, Navy, Air Force, other DOD, and Congressional activities. The TEMA responsibilities as they interact with the CTEIP and with the PMOs are to provide centralized T&E management by establishing and chairing T&E forums as required; administer the Army portion of the Central Test and Evaluation Investment Program (CTEIP) and Resource Enhancement Program (REP); provide staff management of all test programs of interest to the Chief of Staff of the Army; serve as HQDA coordination agent for all T&E policy, resource programming, and related programmatics; manage the HQDA staffing and approval process for TEMPs requiring HQDA approval and OSD approval; support the Deputy Under Secretary of the Army for Operations Research (DUSA(OR)) in his role as a member of the BoD (ES) by serving as the Army T&E representative on the BOD(ES) staff; as the Army representative on the BoD (ES) staff, provide representation to the OSD Test Investment Coordinating Committee (OTICC); represent the Army Test &Evaluation Command (ATEC) requirements at the POM reviews; and serve as the T&E Functional Chief Representative (FCR) in support of the DUSA(OR) in his role as acquisition workforce T&E Functional Chief. As the T&E FCR, furnish the T&E Acquisition Career Field representation to the Army Acquisition Career Management Functional Working Group (AACM–FWG) and to the T&E education oversight committees. Within these responsibilities are the means for TEMA to be a key proponent of the PM in its entry into the CTEIP project formulation and selection process. [Ref. 7]
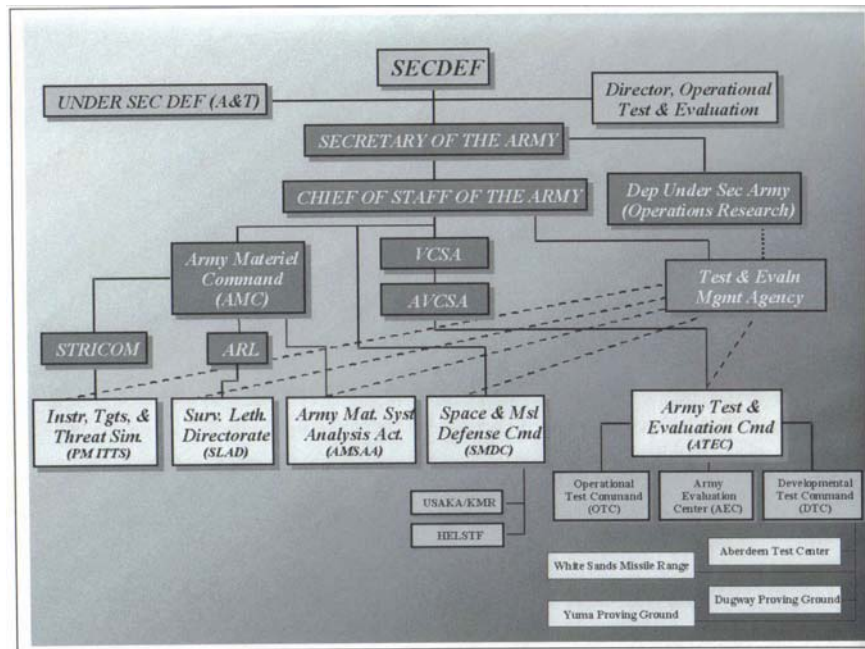
Figure 2.8.   TEMA within the Department of the Army. [From: Ref. 7]

a.   Test & Evaluation Managers Committee

The Test and Evaluation Managers Committee (TEMAC) is an internal Army committee, which supports the Army T&E community. TEMAC conducts studies and reviews as directed by senior Army leadership; provides Army input to DoD T&E strategy and action plans; coordinates among TEMA, PEO/PMs, and Army Research, Development, and Engineering Centers; and serves as a forum for the review and study of issues raised by the acquisition community. TEMAC is chaired by TEMA. The official charter for the TEMAC was renewed at the end of AY 00 for two more years. The committee meets semi-annually to discuss relevant T&E initiatives as well as to continue to work various T&E issues as requested by the Director of TEMA. Each member activity shall identify a T&E manager for membership to the TEMAC. The T&E manager is assigned the responsibility as the central point of contact for all T&E matters between that organization and Headquarters, DA, as represented by TEMA. The member activities that comprise the TEMAC are U.S. Army Test and Evaluation Management Agency, Office of the Chief of Staff (TEMA) (Chair); U.S. Army Materiel Command (AMC) (Executive Secretary); U.S. Army Aviation and Missile Command (AMCOM); U.S. Army Soldier and Biological Chemical Command (SBCCOM); U.S. Army Communications-Electronics Command (CECOM); U.S. Army Medical Command

(MEDCOM); U.S. Army Test and Evaluation Command (ATEC); U.S. Army Developmental Test Command (DTC); U.S. Army Research Laboratory (ARL); U.S. Army Simulation, Training, and Instrumentation Command (STRICOM); U.S. Soldier Support Command (SSC); U.S. Space and Missile Defense Command (SMDC); U.S. Army Tank-Automotive and Armaments Command (TAACOM); U.S. Army Training and Doctrine Command (TRADOC); other agencies as may be required to include Office of the Assistant Secretary of the Army, Research Development and Acquisition (OASARDA); Office of the Director for Information Systems for Command, Control, Communications, and Computers (ODICS4); Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS); Office of the Deputy Chief of Staff for Logistics (ODCSLOG); Office of the Deputy Chief of Staff for Intelligence (ODCSINT); Office of the Chief of Engineers (OCOE); Office of the Surgeon General (OTSG); U.S. Army Industrial Operations Command (IOC); and U.S. Army Materiel Systems Analysis Activity (AMSAA). [Ref. 7]
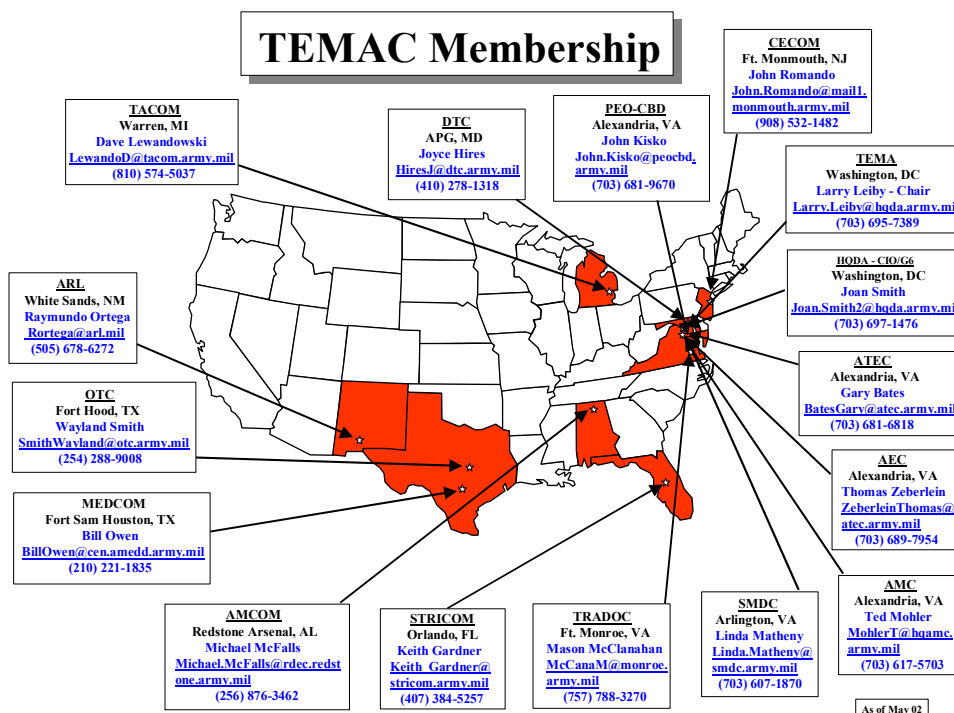
Figure 2.9.   TEMAC Membership Across the U.S. [From: Ref. 7]

2. U. S. Army Test and Evaluation Command (ATEC)

The ATEC headquarters has the oversight of the Army piece of the Test Investment Planning process. One of ATEC's subordinate commands, the Developmental Test Command (DTC), plays an active role in the Needs and Solutions process. ATEC participates on each of the Reliance panels and provides the Army Needs and Solutions on instrumentation and range infrastructure requirements. ATEC headquarters has the final submission approval for all Army recommended needs and solutions. In addition, ATEC is responsible for providing POM inputs for Army T&E requirements. Those requirements are submitted through TEMA, who is responsible for representing the Army T&E requirements at all POM reviews.

3. Program Manager, Instrumentation, Targets, and Threat Systems (PM, ITTS)

PM, ITTS is responsible for managing the research, development, design, acquisition, fielding, modification, and capability accounting of major instrumentation, targets, and threat simulators required for developmental and operational test and evaluation (T&E) and training. PM, ITTS, is responsible for: the management of the Central Test and Evaluation Investment Program (CTEIP) and Resource Enhancement Program (REP) projects for the Army; management operations of targets for T&E and training of Army and Foreign Military Sales (FMS) customer troops; and management of the Army Instrumentation, Targets, and Threat Simulators (ITTS) Long Range Planning Process. PM, ITTS develops and implements policy direction and control over funding and execution of major instrumentation, targets and threat simulator/simulation projects. PM, ITTS serves as the Army's single manager for acquiring targets, threat simulators/simulations, and major test instrumentation.

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III. DATA SUMMARY

A. INTRODUCTION

This chapter presents the data collected to answer the primary and subsidiary thesis research questions. The primary modes of data collection were literature searches and interviews. Literature searches were conducted on the CTEIP guidance documents to include Congressional language, program execution guides, annual reports, program briefings, and Internet websites. Interviews were conducted with the PMO Test Division Chiefs and the Senior Test Team Leads. These interviews were conducted in person, by telephone, and by Internet. Interviews were also conducted with key people in the CTEIP management and oversight chain.

1. PMO Interviews

The interviews with the PMO Test Division Chiefs and the PMO Senior Test Team Leads were the primary method of addressing the primary research questions. The PMOs were limited to those Army PMOs located in and around Redstone Arsenal, AL. The PMOs represented in the interviews include those within the Program Executive Office (PEO), Aviation; PEO Tactical Missiles; PEO Air and Missile Defense; PEO, Intelligence, Electronic Warfare & Sensors; and Missile Defense Agency (MDA). Specific names and offices will not be identified or attributed to specific comments, although anonymity was not requested.

2. CTEIP Management Interviews

Interviews were conducted with key positions within the CTEIP management and oversight agencies. The interviewees were primarily in Army and OSD level offices. These personnel have approximately two to twelve years experience in their current positions. They also have multiple years of experience in the T&E arena serving in T&E service agencies and in OSD level positions and actively participating at all levels of the T&E Investment process. Again, specific offices and names were not linked with specific comments although this was not requested.

3. Literature Search

The literature search was conducted to review the current CTEIP documentation. Program Execution Guides and Annual Reports were reviewed to determine the extent to

which PMO have participated in CTEIP projects now and in the past. The investment process was reviewed to determine the ease with which a PMO could interpret and navigate the path toward CTEIP project proposal submission. Finally, in this time of electronic access, an Internet search was conducted to determine the extent to which CTEIP information existed on the Internet and again, how easily a PMO could utilize the Internet information to prepare and submit a CTEIP project proposal.

C.   DATA PRESENTATION

This section presents the research information obtained to address the primary and subsidiary research questions. In order to determine how a PMO could become more involved in the CTEIP process, it is necessary to define the processes themselves. To that end, a description of the DoD-level Test Investment Process is presented. After a review of the overall test investment structure, the specific processes of the CTEIP and its three projects the JIM, REP, and TTD&D, are also defined. A review of these processes provides information to address the question, "How can a Program Management Office insert themselves into the CTEIP needs and solution process in order to obtain funding for test program developments?" Next in the section is a presentation of the results from the interviews. This information is valuable in answering the primary question, "Would funding from CTEIP be of value to the PMOs test program?" All the research obtained contributed to the overall analysis.

1.   Test Investment Process

To understand the CTEIP Investment process one must first have information on the overall Test Investment process. The DoD Test Investment Review process is mainly interested in investments that have costs of $1 million or more in a single year, or $5 million over the total project development. There are two categories of investments covered by this process: those that are service-unique, and those that are Joint Service investments. The service-unique investments are funded by the services themselves. The Joint Service investments may be funded by a combination of funds from the services involved in the project or through an approved CTEIP project. The review process for service-recommended investments consists of the steps illustrated by Figure 3.1. CTEIP-funded projects are approved by a separate review process and will be addressed later in this chapter. [Ref. 8]

The Joint Program Office for Test and Evaluation (JPO (T&E)) initiates the process with a Needs call to the service Headquarters. This call is for test and evaluation investment needs to address known test capability shortfalls within the Service framework. The services then promulgate the call using their individual processes, and Need statements are generated. Each service then collects, validates, and integrates their test resource Needs and submits them to the JPO (T&E). [Ref. 8]
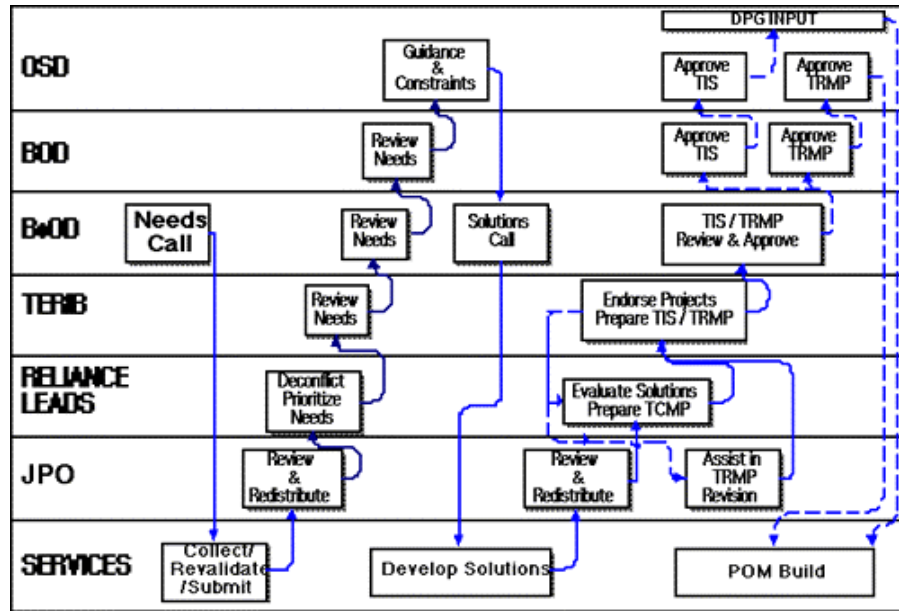
Figure 3.1.   The DoD Test Investment Process. [From Ref. 8]

Upon receipt of each service's list of Needs, the JPO groups them into Reliance areas and parcels them out to the appropriate Reliance Leads. Under the management of the Leads, Reliance Panels evaluate the Needs and recommend endorsement/non-endorsement. The Panels also seek opportunities to combine Needs and resolve conflicts. The lists are then returned to the JPO, which performs the administrative function of collecting the lists and distributing them to the Test and Evaluation Reliance Investment Board (TERIB). [Ref. 8]

The TERIB's primary functions in the process is to deconflict across Reliance areas and to separate those projects that may qualify for joint funding from those that meet only single Service needs. The joint Needs are prioritized and forwarded to the Board of Operating Directors (BoOD). [Ref. 8]

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After review, the BoOD forwards all Needs to the BoD and the Defense Test and Training Steering Group (DTTSG). The Test and Evaluation Resource Committee (TERC) integrates the service joint Needs for which CTEIP funding is sought with Defense Agency Needs, and forwards the integrated CTEIP Needs to the DTTSG. The DTTSG and the BoD develop constraints for Solutions. Initial inputs to the Defense Planning Guidance are provided to the DTTSG. [Ref. 8]

Through the DTTSG, OSD (DOT&E) reviews both CTEIP and Service Needs. It then issues any constraints or guidance to be used in the development of Solutions to satisfy those Needs endorsed by the BoD (for Service) and the TERC (for CTEIP). Once the OSD endorses the Needs list and issues constraints and guidance, the JPO (T&E) issues a Solutions call for Service Solutions, and the TERC issues a call for CTEIP Solutions. The Services then respond in a process very similar to that used for the Needs Call. The Solutions are collected, grouped, and distributed to cognizant Leads. The Reliance panel reviews the Solutions for endorsement/non-endorsement, and after they are deconflicted and integrated, they are submitted to the TERIB and then to the BoOD and the BoD. [Ref. 8]

The Test Investment Planning and Review process hinges upon the production of a Test Capability Master Plan (TCMP) for each Reliance area. This document is intended to define T&E efforts within a Lead area. It describes the scope of the Reliance area, test methodology, existing capabilities, and projected test capability requirements (investments). It also provides the overall direction and architecture for the Lead area. The TCMP is the vehicle by which Reliance evaluates new Needs and Solutions for their congruency with planned efforts and the investment strategy. Each Lead uses the results of the Needs and Solutions call to update the previous year's TCMP to reflect new initiatives, strategies, and areas of emphasis. Each area TCMP is forwarded to the TERIB. [Ref. 8]

The TERIB uses the individual TCMPs and endorsed Solutions to develop two documents: the Test Resource Master Plan (TRMP), and the Test Investment Strategy (TIS). These documents are intended to serve as blueprints to define and guide the Service-wide test investments. The TIS provides a concise statement of the long-term

objectives to be gained by these investments. The TRMP serves as the road map to attain the TIS's vision and includes an integrated and prioritized compendium of individual projects intended to execute the plan. The actual process by which Reliance develops the TRMP and the TIS includes various feedback mechanisms whereby the TERIB can confer with Reliance Leads to negotiate acceptable compromises. If participants at the working level cannot reach agreement, the process allows unresolved issues to be carried forward to higher authority (BoOD, BoD, or ultimately DOT&E). Upon completion of the TRMP and the TIS, the TERIB sends the documents to the BoOD and then the BoD. Through DOT&E, OSD approves the final TRMP. This ensures that, in addition to serving to communicate a common investment strategy to the T&E community, the TRMP and TIS are used by OSD in its development of the Defense Planning Guidance. Thus, OSD and the Services will consider T&E investment priorities in their individual Program Objective Memorandums (POMs). [Ref. 8]

2.   CTEIP Investment Process

The investment planning process for CTEIP is a joint process and is integrated into the overall DoD T&E investment planning process that was described in the previous section. The overall DoD T&E investment planning process is synchronized with the Planning, Programming, and Budgeting System (PPBS). The total objective of the CTEIP process is to have a set of joint T&E investments of high priority identified, reviewed, evaluated, and approved so that the funding profiles for the approved projects can be included into each biannual (POM). The investment planning for DoD T&E is a continuing process of determining test requirements (Needs) and selecting specific test investments (Solutions) that will alleviate the shortfalls in test capabilities. [Ref. 1:p. 4]

The OTICC is the advisory body for DOT&E for the oversight and management of CTEIP. An integrated CTEIP planning process is in place. Participation in this process by the T&E Executive Agents (T&E EA), the services, and the Defense Agencies is critical to responding to the PPBS timetable. This timetable is described in Table 3.1.

Months	Fiscal Year	Activities
Feb	XX-3	T&E EA issues FYXX Needs and Solutions Call.
Jun	XX-3	Services submit Needs and Solutions DOT&E forwards Defense Agency Needs and Solutions to T&E EA.
Jan	XX-2	Defense Planning Guidance (DPG) issued.
Feb-May	XX-2	POM preparation for FYXX to FYXX+5.
Mar	XX-2	T&E EA forwards deconflicted and prioritized CTEIP proposals to DOT&E.
May	XX-2	DOT&E resources proposals and includes results as CTEIP input to the POM.
Jun	XX-2	DOT&E submits CTEIP input to FYXX POM.
Jan-Feb	XX-1	FYXX President's Budget (PB) submitted to Congress.
Mar-Sep	XX-1	Congressional enactment of FYXX Defense Appropriations.
Oct	XX	FYXX funding approved.

Table 3.1.   Integrated Test Investment and PPBS Process. [From: Ref. 1:p. 5]

Although the process is continuous, there is a beginning point. Every two years, the T&E EA issues a Needs and Solutions Call to the services T&E headquarters, who, in turn, disseminate it to their service T&E agencies. It is also sent to DOT&E who forward it to the participating Defense Agencies. This is an organized means of giving the entire DoD community the opportunity to submit their test capability investment requirements. For any given POM fiscal year, the Call is issued three years before the appropriation. The Defense Agencies then forward their CTEIP Needs and Solutions to DOT&E, who forwards them to the T&E EA for deconfliction, elimination of duplication, and possible consolidation with like service Solutions. Those Solutions that have the potential of meeting the CTEIP criteria, mainly that of jointness, are prepared as CTEIP proposals, prioritized, and submitted to DOT&E for consideration as a validated CTEIP project and incorporation into the POM. [Ref. 1:pp. 4-5]

3.   CTEIP Project Selection and Execution

a.   Joint Improvement and Modernization (JIM) Projects

The CTEIP JIM projects fall out of the overall T&E Investment Process and the CTEIP planning process described in the sections above. Key to obtaining an approved CTEIP project for inclusion in the POM is the preparation of a proposal. The JIM proposal should clearly demonstrate the benefits to the T&E community through the

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execution of this particular Solution. It should also specify clearly that it be in answer to a valid Need.

The evaluation of the proposal takes place at each level of the process within the services, the Defense Agencies, and within the T&E EA. The proposal should be able to clearly answer questions that reflect the Congressionally set criteria of CTEIP. Is the requirement valid? Is it generic or reflective of a specific program? Can the requirement be satisfied in another way? Does the proposed capability have multi-service or joint application? Are there sufficient potential users of the proposed capability to justify the development expense? Will the project be interoperable with other DoD facilities? Are the risks acceptable? [Ref. 1:p. 6]

After receipt of the proposals from the services, T&E EA will send a prioritized list of CTEIP proposals to DOT&E. This list will be used to build the CTEIP input into the POM. At any given time there are continuing projects in various phases as well as proposed new start projects. The funding levels for the new start projects will be dependent on the funding needs of the ongoing projects and on the fiscal guidance given for the POM years. [Ref. 1:p. 6] The total CTEIP POM submission is then submitted to the OSD Comptroller. If a project is not considered for the first two years of the POM, it will not be considered further. Continued consideration will only occur with resubmission through the Needs and Solutions Calls. [Ref. 1:p. 7]

Once a project is identified as a JIM project, the CTEIP PEM prepares a Test Package Directive (TPD) that is sent to the Service or Defense Agency OTICC member. The TPD initiates Phase I of the project and directs the preparation of a Test Capability Requirements Document (TCRD), a draft Life Cycle Support Plan (LCSP), and a Program Management Plan (PMP) to include an Analysis of Alternatives (AoA) as an annex. In the TPD, the executing service or Defense Agency is identified. The JIM projects are then executed by organizations with the required technical expertise, management structure, facilities, and support elements within the designated Service or Defense Agency. Overall management oversight is always provided by the OTICC and the CTEIP PEM; however, day-to-day management is left to the individually named Project Director (PD). [Ref. 1:p. 7]

The transition from Phase I to Phase II is based on the completion of the actual concept development and the completion and approval of the required documentation. During Phase II, the TPDs are prepared annually for signature of the CTEIP PEM. Also required of the executing PD are a PMP submitted annually; monthly status reports; annual Mid-Year Review briefings; program reviews as deemed necessary for the development process and as requested by the OTICC; and a final report at project completion. Financial management reporting is required as a part of the monthly status reports, all reviews, the Mid-Year Review briefing, and the final report. [Ref. 1:pp. 10-13]

b. Test Technology Development and Demonstration (TTD&D) Projects

The TTD&D project and subproject nomination process begins with the issuance of a Call for Proposal memorandum signed by the TTD&D Project Director. This usually takes place in February of each year with the subprojects to begin the next fiscal year. Proposals are submitted to DOT&E through the service or agency formal chain of command to the service/agency coordinator and the OTICC representative. The service/agency coordinator and the OTICC representative are responsible for reviewing and prioritizing the proposals prior to submitting them to DOT&E. They are then forwarded to the TTD&D Working Group for review. [Ref. 5:p. 3-1]

The selection criteria for the TTD&D subprojects are based on the national T&E/Training/Warfighting priorities; DoD guidance and policy; evolving technologies; and future forecasts of Warfighting capabilities and needs. On an annual basis, the TTD&D PD will submit to the DDOT&E/RR, through the CTEIP PEM, a list of recommended subprojects for the coming year. A Letter of Instruction (LOI) will be prepared to provide specific direction on the project execution. Monthly status reports are submitted by the PD for each funded subproject, to include obligation and expenditure data. Annual assessment reports are submitted through the service/agency coordinator no later than the end of August. Release of next year funding is contingent on the receipt of this report. A Mid-Year Review briefing will be prepared on the progress and status of the subprojects. These are not presented individually at the CTEIP

Mid-Year Review, but a synopsis of the entire TTD&D project is given based on the individual briefings. [Ref. 5:pp. 4-1 to 4-4]

Congressional language in 2001 established the Test and Evaluation, Science and Technology (T&E/S&T) Program Element. This new program began in FY 02 and focuses on transitioning technologies from the laboratories, academia, and industry to T&E capability developers. The objectives of the new program were so similar to TTD&D that there was concern of the efforts being deemed duplicative, therefore, the decision was made by DOT&E to begin phasing TTD&D out as a distinct CTEIP project beginning in FY 03. Ongoing projects will be completed with the last year of execution being FY 04. Discussion on the TTD&D was left in this thesis to provide information to the PMO. The selection criteria for the S&T programs will be similar to that described within this document.

c.   Resource Enhancement Projects (REP)

Preliminary Test and Evaluation Master Plans (TEMP) for major acquisition programs are submitted to OSD prior to the Milestone A review. Estimated key OT resource requirements are defined within the TEMP to the extent known. Known resource shortfalls should also be defined in the TEMP. In-cycle REP subproject proposals typically support OT efforts in response to the known TEMP defined shortfalls. At times, REP proposals in answer to previously unknown OT requirements are presented, usually out of the normal project selection cycle. These later REP proposals are the prime candidates for the short time frame of the REP projects. [Ref. 2:p. 3-1]

Nominations for REP projects may originate from the service or defense agency representatives, but only the REP WG voting members can formally submit the projects for REP funding consideration. The REP WG then reviews and prioritizes the nominated subprojects and submits the list to the CTEIP PEM. The Deputy Director (R&R) coordinates with OTICC to make the final determination and recommendation to DOT&E. The list of DOT&E approved subprojects will become the approved REP for that given fiscal year. [Ref. 2:p. 3-2]

There are specific criteria that the candidate subprojects must meet before they can be accepted for REP funding. The subproject must not require more than three

fiscal years of funding. The subproject must resolve a documented OT shortfall within three years of the project's start. The shortfall must be consistent with ongoing formalized OT planning as reflected in an approved TEMP or other approved OT&E planning source documents. The subproject must support a milestone decision or a major development decision on a system, to include major upgrades, within the next five years. The subproject must have a firm completion date prior to the first documented OT need date. The subproject must be executable. In addition to the project criteria, there are constraints on the funding received from REP. REP funds may not be used for the conduct of OTs or for Operation and Maintenance (O&M) costs that occur after the initial installation. The manufacture or procurement of multiple copies of a capability is not allowed unless the duplication is specifically required to resolve a documented shortfall. [Ref. 2:p. 3-7]
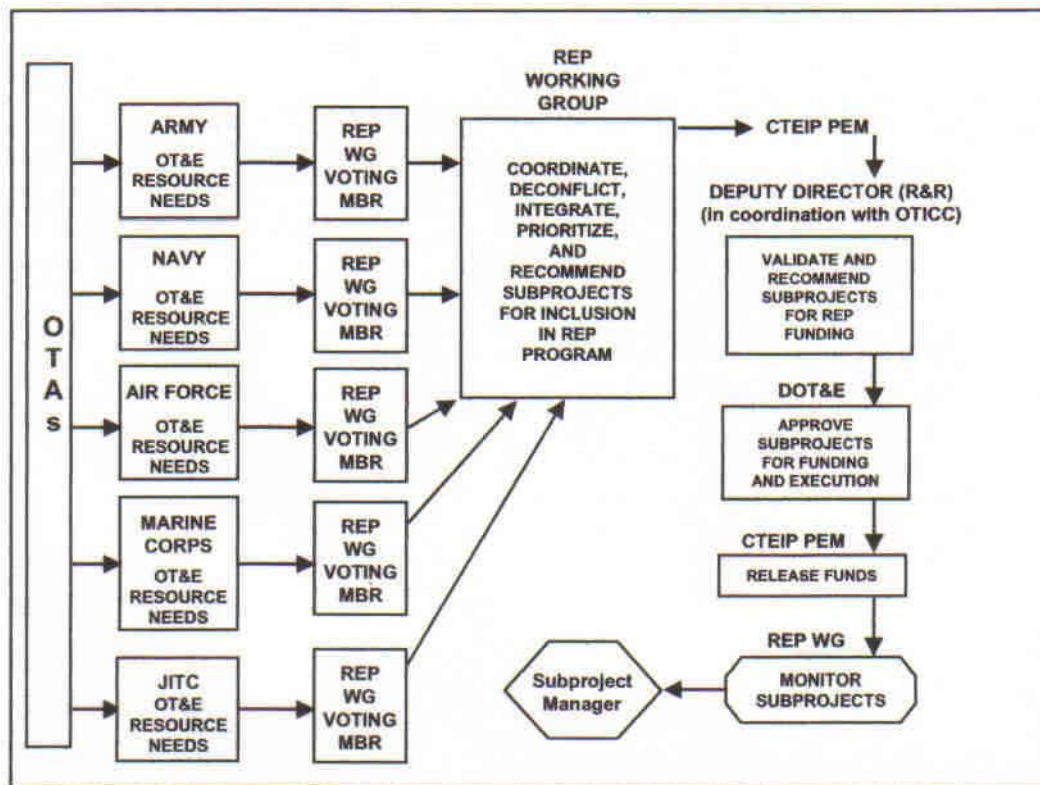

Figure 3.2.   REP Subproject Nomination and Approval Process. [From: Ref. 2:p. 3-2]

It is recognized by the REP WG that unforeseen OT&E issues arise at any time during the year. Any proposal considered out-side the normal PPBS timeline is referred to as an out-of-cycle nomination. The REP WG will consider these out-of-cycle

nominations at any time during the year. There are guidelines for submitting an out-of-cycle proposal. The full nomination package must be prepared and submitted to the WG member representing OTA. Time at an upcoming REP WG meeting is requested by the WG member in order to address the special request. It is then reviewed and prioritized as the other nominations were. If the request is received prior to the REP PMP being finalized, then all the candidates are re-prioritized to include the new request. If the nomination is received after the REP PMP is issued for a given FY, then the REP WG will review it and an appropriate course of action will be recommended through the CTEIP PEM to the Deputy Director (R&R) and the OTICC. The recommendation will address priority and any necessary reprogramming of funds or the need to seek additional funds from OSD. The executing service or defense agency OTICC Principal must concur before any REP subproject loses funds due to the approval of an out-of-cycle submission. [Ref. 2:p. 3-11]

A PMP is prepared by the REP WG chairman in response to the TPD issued by the CTEIP PEM. The approved PMP represents the project baseline. It contains the subproject Quad Charts, consolidated milestones and schedules, and O&E plan summary. The TPD contains guidance against which the subproject manager will execute the subproject. In response to the TPD, the subproject manager will prepare a Subproject Management Plan (SMP) and submit to the REP WG member and OTICC Principal. The approved SMP becomes the contract against which the subproject's progress will be measured. [Ref. 2:p. 4-2]

Funds for the subproject are released by the CTEIP PEM to the designated REP Financial Manager. Obligations, expenditures, disbursements, and accruals are tracked by the REP Financial Manager and reported in the monthly status reports and in any subproject reviews. All REP subprojects are reviewed at least twice annually. The first review takes place in a joint meeting between the OTICC Principals and the REP WG in preparation for the CTEIP Mid-Year Review. The second review takes place on-site or near the location of the subproject execution. [Ref. 2:p. 4-4]

4. Interviews with PMO Senior Test Personnel

The personnel interviewed for this research are all senior team leads and division chiefs within the test area of the PMO at the GS-14/15 level or equivalent. They are in

positions classified as being Acquisition Critical and are members of the U. S. Army Acquisition Corps. They are all Acquisition Corps Certified at Level III in the areas of Test and Evaluation; Systems Planning, Research, Development and Engineering; and/or Program Management. They had all obtained their certification through Government training courses, generally sponsored by the Defense Acquisition University. This requires undergoing a certification process based on training in the required field, or work experience of a defined length of time. Level III Certification in the area of Test and Evaluation requires three separate classes for a total of 160 hours of classroom training in the specifics of Test and Evaluation Management within the acquisition process. They each also have approximately 5-10 years or more of PMO experience.

A majority of the interviewees indicated a minimal or total lack of knowledge of the CTEIP, its programs, or its potential value to their test program. When a brief explanation of CTEIP was provided, the test personnel indicated that this would be of value to their program and they would be interested in learning more about CTEIP. Most indicated they did not remember the topic of CTEIP being a part of the certification training courses. The few interviewees that did have knowledge of CTEIP also had extensive experience with sponsoring and managing CTEIP projects both within their PMO as well as within prior test agencies. They indicated that their CTEIP knowledge was not a result of acquisition training, but of on-the-job involvement with CTEIP; attendance at T&E sponsored conferences; and continual coordination and contact with personnel in the T&E community. For those that had managed CTEIP projects for their PMOs, they described CTEIP involvement being extremely valuable to the PMO test program success. They indicated that they would prefer to manage the CTEIP project themselves, within the PMO, rather than indirectly through a test agency. Maintaining control of the CTEIP project helped, in their mind, to ensure that their test program stayed within their control as well. They also indicated that the management requirements of CTEIP projects were very time intensive, requiring at least half a man-year of effort and usually a full man-year. This was hard for the PMOs to commit to, as the PMO resources are usually very tight over a broad area of responsibilities. When one of the PMOs tried to get information on CTEIP points of contact to establish how they could get involved, they went to the Internet as part of their search. They found the

Internet information slightly confusing, but very helpful. However, the contact information was outdated with incorrect names, phone numbers, and email addresses requiring further searching before they could establish contact.

5. Interviews with CTEIP Management

The personnel interviewed for this research are all senior level T&E experts at the GS-14/15 level or equivalent. They have all worked their way up through the ranks of test agencies of a variety of services. They have been involved in the T&E investment process for 5-10 years and with CTEIP, specifically, for at least 3 years. Most have significantly more time in this field. They currently are working at the Pentagon in service headquarters level offices or OSD oversight offices. They work closely with the policy and decision-makers within the T&E arena. These interviewees are not all part of the Acquisition Corps and do not all have a requirement for acquisition certification as part of their responsibilities.

The CTEIP management interviewees indicated a definite value to both CTEIP and the PMOs if the PMO was more involved in the CTEIP process. The PMO would obtain value by getting required test assets and capabilities faster and for lower cost. CTEIP would benefit by having valid partners in their developments with valid requirements for the test investments. They indicated that they would prefer to have the CTEIP projects managed within test agencies, rather than within the PMO. They acknowledged a need to get out to the PMOs more often, but were pressed to find personnel to accomplish this. Most of those interviewed worked in severely understaffed offices with many requirements on their resources. There was a mixed response on the degree to which they should reach out toward the PMO, some feeling the avenues were already in place for the PMO to get all the T&E support necessary. But all agreed that there was room for the OSD and Headquarters level management to reach out to inform and educate the PMOs on the value of CTEIP and the total T&D Investment process. There were no current PMO sponsored or managed CTEIP projects, although they were working very closely with several PMOs, even to the extent of having a Test Officers co-located in Headquarters offices while test requirements were being defined. It is at this stage or earlier that the CTEIP management interviewees felt the PMO should initiate dialog to define their T&E requirements and test shortfalls.

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IV. DATA ANALYSIS

A. INTRODUCTION

This chapter presents an analysis of the data that was presented in the previous chapter. The subject of the analysis was the data obtained to answer the primary thesis questions: "How can a PMO insert themselves into the CTEIP Needs and Solutions process in order to obtain funding for test program developments?"; "Would funding from CTEIP be of value to the PMO's test program?"; and "How can a PMO become aware of the availability and applicability of CTEIP funding for their test programs?"

B. AREAS OF ANALYSIS

After analyzing the literature research and the interview responses, it was decided that the analysis would concentrate on key factors within the PMO and the CTEIP management and oversight agencies. These key factors were determined to be common areas contributing to the current disconnect between the CTEIP management and the PMOs. They were serving as barriers to the PMO insertion into the T&E investment process. The areas are identified in the following sections.

1. Organizational Culture

The culture within an organization is defined by the norms and traditions that make up that organization. These norms and traditions also define how an organization reacts to internal and external influences. Organizational culture can be defined as a framework of attitudes, values, behavioral norms, and expectations that are shared by the members of an organization. [Ref. 9:p. 256] An analysis of the organizational culture of the PMOs and the CTEIP management structure provides insights pertinent to this thesis.

2. Communication

Communication is the process by which information is sent out and information is received. [Ref. 9: p. 125] The communication processes and policies are a result of the culture that is evident within an organization. But looking at this on its own also examines the extent of the effort made by the PMOs and CTEIP to react within their overlapping communication environments.

3. Skill Development

Organizations consist of personnel. The knowledge base of these employees is a key contributor to the effectiveness of those organizations. Classroom training is but one method of expanding a knowledge base. The analysis of the data includes a review of the knowledge that PMOs had of CTEIP and the identification of skills necessary within both organizations to facilitate interaction.

4. Program Policy and Strategy

The internal policies and strategies adopted by organizations also have an impact on the outcomes obtained. It is in this area that the data pertaining to the Test Investment process, CTEIP planning process, and CTEIP sub-project selection criteria was analyzed. A review of these policies and strategies within the context of the PMOs and CTEIP interaction provided some significant insights.

C. ANALYSIS

1. U. S. Army Program Management Offices, T&E Divisions

a. Organizational Culture

The PMO organizational culture is a very success-oriented environment. The personnel generally have many years experience in other PMOs and bring to the office an understanding of the office structure and work ethic required to handle the task of managing the development of a DoD weapon system. Internally, there is much competition between the varying functional divisions, but that is usually handled in good fun. The personnel are nothing but professional, and in the better situations, form a well-bonded team, each managing a portion of the whole. Externally, the PMO usually puts forth a united front. Many of the decisions made within a PMO have a basis in politics rather than actual program performance. Due to this, the PMO personnel are usually reticent to put full trust in other agencies when the cost or schedule of the program is dependent on the agencies' actions. This is especially true when it comes to any OSD-level office or test agencies. These agencies have final decision authority on many aspects within the PMO. The PMO would rather maintain a close-hold attitude on potential sensitive information, as in unavailable test resources, than to admit a potential program deficiency to someone from OSD or the test community. Test and Integration IPTs allow the PMO to maintain a certain level of control and still give the appearance of

coordination. The PMO is also reluctant to tie the success of their test program to a particular technology or development that may not be available to meet the program schedule. All these contribute to the extent that a PMO would attempt to participate in the T&E Investment process.

b. *Communications*

The PMO is very good at communicating with the agencies that contribute what they perceive as value to their program, but this communication falls within the areas that the PMO wishes to control. By being proactive in communicating with internal divisions and external agencies, the PMO tries to head-off any attempts to negatively impact the program. This means that the external communications are usually very controlled to maintain a distance between the PMO and potentially adversarial agencies such as OSD and the Test communities. The test community has perceived this as the PMOs not planning well for future test needs, and as not being very forthcoming in expressing the true test requirements. More open communications between these groups could begin to change these perceptions. The active use of true IPTs is beginning to make a difference.

c. *Skills Development*

The personnel interviewed for this research were all senior team leads and division chiefs within the test area of the PMO, occupying positions that are classified as Acquisition Critical positions. This requires undergoing a certification process based on training in the required field or work experience of a defined length of time. Once a Level III certification is achieved, there is a continuing educational requirement of eighty hours of training every two years. Since a sufficiently high number of the interviewees were unaware of CTEIP and of how it could benefit their program, the certification training obtained was obviously lacking. Most had attended conferences as part of the continuing education, but these predominately were in technology areas relating to their program or to service and program level conferences. Very few had attended T&E specific conferences on a regular basis.

d. *Program Policy and Strategy*

PMOs are very IPT and team oriented. It is usually necessary to get input from many agencies in order to get through milestone reviews. To this end, PMOs have

always employed some form of IPT structure. But the acquisition strategy of the program is the ruling document. While there are other documents that dictate action at different phases, the PMOs do all things possible to keep the schedule and cost of the program intact. In the cases of the inevitable schedule slips and cost overruns, the test program suffers from budget reductions and schedule crunches. This does not build goodwill between the PMOs and the test community.

2. CTEIP Management

a. *Organizational Culture*

The test community is very parochial in nature. The test agencies, activities, and ranges function as closed environments in much the same way a PMO functions. There is doubt by the test community that the PMOs will actually allow the test agencies to conduct valid tests on their systems. They construe the constant shifting of test requirements within a PMO as lack of commitment rather than a response to political pressure.

b. *Communications*

The CTEIP management and oversight agencies have a very complex network of communications and coordinations that are required to support the T&E Investment process. Yet this elaborate network lacks a fundamental participant, the PMO. The program execution guides that define the nature of CTEIP and the entire project selection process are available to all who wish to use them, but they are primarily circulated among the test community. Internet access to information and points of contact exist, but are outdated and incorrect. Portions of the T&E community Internet access require approved access, if the PMO knows who to contact for that access. The CTEIP management offices suffer the same time and personnel resource constraints as the PMOs. Therefore, one-on-one communication with each and every PMO is not feasible.

c. *Skills Development*

The personnel within the test agencies are very well versed in the activities and requirements within the test community. The Army T&E community is part of the Acquisition Corps and has the same certification and continuing education requirements as the PMO personnel. The test community, though trained, lacks the fundamental

understanding of PMOs. This makes understanding the needs of a PMO hard to accomplish.

d. Program Policy and Strategy

The policies and strategies espoused within the Test Investment process do not include input from the PMOs. While there could be a very indirect inclusion of the PMOs, with the assumption that the test agencies receive their requirements for Needs and Solutions from the PMOs, this is not always the case, at least not within the Army PMOs surveyed. It is probable that the PMO TEMPs are being reviewed for the test technologies and resources required to test the system. PMOs are not going to submit any official document that has requirements they or someone else may not meet. Therefore, the majority of the T&E Needs and Solutions come from within the test community. This is an aspect of the parochial nature of the test community, which fosters mistrust from the PMOs.

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V. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The intent of this thesis was to review CTEIP and evaluate the extent to which PMOs are involved in the submission of test and evaluation needs from which CTEIP projects are selected. The objective was to determine if the CTEIP managers for potential projects directly or indirectly solicit PMOs, and how the PMOs can more directly insert themselves into the project selection process. The research revealed that both CTEIP Managers and PMOs felt there was definite value to the PMOs being involved in the TE& investment process; however, they disagreed as to how the PMO should be involved. A detailed analysis of the current T&E investment process, the CTEIP planning process, and the CTEIP sub-project selection process was conducted and nowhere was there mention of PMO direct or indirect involvement in the processes. This chapter presents some conclusions drawn from the analysis of the research data as well as answers to the research questions. Recommendations for the PMOs and the CTEIP management are also provided. Finally, suggested future research areas are identified that could expand on the ideas presented in this thesis.

B. CONCLUSIONS

1. U. S. Army Program Management Offices

The prevalent culture in the PMOs promotes planning success-oriented programs. While this may be positive in nature, it can adversely influence the choices made in the planning process. Unavailable test items will not always be identified as a necessary requirement due to the mistrust that it will adversely affect the PMO's test program, and in turn, the total program. There is especially a level of mistrust toward OSD agencies. A statement of a test resource deficiency could end up being interpreted that the program is un-executable. Therefore, the PMOs paint a cautiously rosy picture, hoping that the necessary technology comes along to test their systems, but reticent to jump on the bandwagon to support the test asset development. This is detrimental to both the PMO's success and the T&E community's success.

The PMO T&E workforce is not as informed as it should be to adequately plan and implement successful test programs. Despite Acquisition Level III certification in

the T&E career field, they lack a fundamental understanding of the T&E Investment process and the T&E agencies and organizations that exist to aid the PMO in test planning and resource allocation. They lack a working knowledge of similar technologies being tested within the Army and within other services. This seems to stem from the prevalent PMO culture, which assumes that the T&E community is only there as support and is not aware of the PMO-specific issues. "You don't understand my program strategy" is an often-used phrase at times when coordination is attempted. The PMO is also reluctant to approve attendance and participation by its personnel at meetings and conferences not directly related to the program. This isolates the PMO professionals from a valuable resource of ideas.

The PMO program strategy and planning also takes on an "us against them" attitude. While cooperation and IPTs are actively promoted, the PMO stands staunchly by its program planning, and comments or ideas by all outsiders are perceived as being detrimental to the program. The words of cooperation and coordination with the strategies are not implemented to the full benefit of the program.

2. CTEIP Management

The CTEIP management and T&E oversight agencies have their own prevailing culture. They understand the importance T&E plays within the development of a system, yet they feel that the PMOs do not understand. PMOs are forever cutting budgets and schedules, and creating scenarios to save time and money. Therefore, they could not possibly understand the importance of testing and would not have any valid input to the T&E investment process. While that is not always the case, it seems to be a common perception.

The T&E professionals that ultimately manage the development of investment projects are not as well versed in the acquisition management principles as they should be. Some of them are part of the Acquisition Workforce and Acquisition Corps, especially in the Army T&E community, but very few have ever been part of a true acquisition office, such as a PMO. The acquisition training is very good, but it does not replace the experience gained working in a PMO. Also, the times that they do attend the program reviews, their main interest is in the technical briefings, not the programmatic briefings. This is understandable, but raises the question of why a test agency would not

want to be aware of any programmatic issues that might ultimately affect the test program? Again, coordination and cooperation between the PMO and the test community is sorely needed.

Generally, the CTEIP management acknowledges the CTEIP policies and strategies that involve coordinating with PMOs. Unfortunately, they do not have the manpower resources necessary to individually provide information briefings to each PMO. They do recognize that the success of the CTEIP projects depends on the support from and championship by major system development program offices. Yet, in most cases, they rely on second or third hand references for this support or from a top-down edict without coordinating directly with the PMO.

C. RESEARCH QUESTIONS

1. How Can a Program Management Office (PMO) Become Aware of the Availability and Applicability of CTEIP Funding for Their Test Programs?

The first way a PMO can become aware of CTEIP, if it is applicable to their program, is to talk early and often with the T&E community. Start with the T&E points of contact at their own command. Then, coordinate with the local TEMAC on the timing of the Needs and Solutions data call and possible technology areas that could become CTEIP proposals. They should work with the ATEC representative to the PMO's Test and Integration Working Group or T&E Integrated Product Team (IPT) to develop a strategy for obtaining the needed test assets, instrumentation, and improved infrastructure necessary to test their program. Finally, they should look to the OSD CTEIP management for coordination with other service programs that might have similar technology needs.

However, even before the coordination takes place, the PMO test personnel must be knowledgeable on the total test investment process. They must go beyond the Acquisition Test and Evaluation Level III Certification training and seek out the information through talking with the T&E community, attending conferences that address the T&E Investment planning, and look forward and outward beyond the stovepipe of their own program. This will involve some changes in culture within the PMO to reach

out and trust the ATEC and OSD level test community, but effective training, education, and experience will be the beginnings of that culture change.

2. Would Funding from CTEIP be of Value to the PMO's Test Program?

Anything that will assist the Program Manager to field a better product in a shortened timeframe for less money is of value. Test programs for any acquisition system make up a large portion of the overall development cost. The funding value can result from a directly sponsored CTEIP project managed by the PMO to address short-term, previously un-addressed test requirements. The value can come from teaming with another service or a test agency to address a multi-service need that will aid in the testing of a new technology for years in the future. The value can result from the PMO clearly identifying their future-technology areas, adding their weight to CTEIP projects development, and improving the overall test infrastructure. All of these possibilities add value to the PMO test program by providing resources of time, money, and equipment or facilities to an already stretched-thin program. All of these will provide the PMO with a better test, and in turn, a better weapon system will be delivered to the field and soldier. This is the value to the PMO.

3. How Can a PMO Insert Themselves into the CTEIP Needs and Solution Process in Order to Obtain Funding for Test Program Developments?

To become an integral part of the T&E Investment process, the PMO must first educate its personnel on the process; become familiar with the process and the key agencies that make decisions throughout the process; and find the area or part of the process where they can contribute the most input. Next, the PMO should coordinate constantly with the test agencies that are already a part of the Needs and Solutions process. Even if direct involvement is not the best way to proceed, coordinating with the test agencies on the test needs of particular programs and technologies will eventually pay dividends through improved test capabilities at the test agencies. Finally, the PMO test personnel should become familiar with the process for submitting Needs and Solutions, and start participating in the process. It may take some time, which is at a premium in a PMO, but eventually the participation will pay off.

4. **What are Some Strategies that the CTEIP Management Could Use to Educate and Offer Assistance to PMO Personnel?**

The CTEIP management could start with some simple things to educate and assist PMOs. The easiest way is to ensure the CTEIP and DOT&E websites are up-to-date and accurate. This can become a gateway for the PMO to enter the CTEIP and T&E Investment process. However, incorrect and out of date information can stop the PMO in its tracks and continue the disconnect that exists today. CTEIP and the Army T&E agencies already participate and sponsor conferences and seminars that promote T&E awareness. Finding a way to advertise these to the PMO test personnel and encouraging their involvement at the conferences would spread some of the T&E awareness into the PMOs.

D. **RECOMMENDATIONS**

1. **U. S. Army Program Management Offices**

The PMOs should coordinate more actively with the available test organizations and agencies. The IPT process has improved communication and coordination somewhat, but there is still hesitancy and mistrust in presenting potential program weaknesses to the T&E agencies and especially to anyone in OSD. It is felt that if an unavailable test asset or capability is identified as a definite requirement, then several things might happen. The program could be deemed un-executable; the program could be made to pay for any needed upgrades or developments to obtain the test capability; or the program could suffer schedule slippages that would affect the overall program cost. This is a cultural manifestation within the PMO organizations. This must be overcome. There needs to be dialog early in the program life cycle between the PMO and the T&E community to plan out all needed T&E investments that are required to adequately test the planned development system. These discussions should not tie the hands of the PMO and their program execution, but the PMO must be willing to actively support the T&E development and not be ambiguous about the capability need.

The PMOs should recognize that personnel have a variety of training experiences available to them. Level III acquisition certification is not the end of the learning process within a given career field. Involvement in T&E specific conferences and symposiums allows exposure to a variety of technologies, capabilities, and contacts in the T&E

community. This serendipitous learning can reap endless value, especially for start-up PMOs and those seeking to integrate new technologies into their systems. The opportunity to attend as many T&E related events as possible should be a priority of the continuous learning experience. Likewise, attendance at program reviews of like-systems, even in the other services, could provide even more benefit to the PMO. T&E knowledge and resources must be learned so that they can be utilized in the most efficient and expedient manner.

Finally, the PMO program policies and program strategies must support the T&E investment process. Testing is a vital piece of the development process. Selling it short by reducing the number of tests and reducing the test budget can be a reality. But every effort must be made to maintain the integrity of the system testing by ensuring enough time and resources. We owe it to the soldiers that will be using our systems.

2. CTEIP Management

The CTEIP management and oversight agencies, as well as the T&E Investment planning community, should include the PMOs at every possible step. While they may not be directly tasked to respond to the Needs and Solutions data calls, the PMOs should be notified when the T&E agencies have received the data call so that investment needs or possible solutions can be submitted through the appropriate channels. The PMOs have a direct contractual link with industry. This link could provide knowledge of on-going and state-of-the-art technologies that are being planned and developed for current acquisition developments. The PMOs are the ultimate customers of the T&E community and they should be included in the identification of pressing T&E issues and needs. This would be a mutually beneficial partnership for both the PMO and the CTEIP and T&E Investment process.

The T&E Community sponsors many conferences and symposiums for its membership. A more concerted effort to include PMO personnel on the distribution list for these events could provide valuable opportunities for both organizations. One way to involve PMOs would be to invite some of the PMO T&E leads to the CTEIP Mid-Year Review Briefings. This would be an excellent way to become familiar with the types of investment programs that are sponsored and the type of work done across the services. Another such conference that has been held in Huntsville, AL since 1998 is the Army

T&E Days Conference and Exhibition. This event is sponsored by TEMA and the AMCOM TEMAC and involves 3-4 days of speakers, working sessions, and exhibits that showcase the best that Army T&E has to offer. Coupled with this event is a day of T&E specific training and special topic courses. It is possible that either as part of the briefings or as part of the training sessions, more in-depth information on the T&E Investment process and CTEIP could be shared with the attendees. CTEIP is a success story and should be shared. The educational process could also be furthered by clearly identifying in the exhibition the programs that received CTEIP sponsorship.

Finally, the T&E investment policy and strategy should explicitly address active coordination and cooperation with the PMOs. While this is currently in the policy and strategy plans, the implementation of this has fallen to the wayside. The culture within the T&E community needs to begin to foster a cooperative attitude in which resources are shared. The end result of both the T&E community and the PMOs efforts is the best system possible for the warfighter.

E. FUTURE RESEARCH AREAS

During the course of this research and analysis, several areas were highlighted as topics for potential research papers, thesis topics, and long-term projects:

1. Organizational Systems Analysis

Propose that the interaction between the PMO and the Test Investment Process be researched and analyzed utilizing the Systems Organizational Framework. This could provide valuable insight into the inter-relationships of the two separate organizations and provide guidance on how they could interrelate better.

2. Test Culture

The culture prevalent in the test community impacts the interaction this community has with all other communities, especially the acquisition community. Further research could dissect that culture to discover key factors impacting the culture and impacting the interaction with other cultures.

3. PMO/Acquisition Culture

The culture of the PMO is very different from that of the test community. A comparison of the two cultures could be done. The PMO has a much more political

outlook that impacts the decisions made within the program strategy. The effects of this culture on successful or unsuccessful test program could be a valid research topic.

4.   T&E Strategic Planning and Management

The total test investment process could benefit from the development of a strategic management plan. Increased interest and funding on the need for advances and improvements in the test infrastructure has brought the focus to looking to industry and the technological advances that are being developed both for weapon systems and for test instrumentation. An analysis of selected areas or programs could identify the appropriate model or models to be used in the development of the plan. Once a plan is in place, then the priorities could focus on the actual implementation of the plan. This same approach could be accomplished from the PMO standpoint toward a total strategic management plan for a test program.

APPENDIX. LIST OF ACRONYMS

AACM-FWG	Army Acquisition Career Management – Functional Working Group
AoA	Analysis of Alternatives
AMC	United States Army Materiel Command
AMCOM	United States Army Aviation and Missile Command
AMSAA	U. S. Army Materiel Systems Analysis Activity
ARL	United States Army Research Laboratory
ATEC	United States Army Test and Evaluation Command
AVCSA	Assistant Vice Chief of Staff of the Army
BMDO	Ballistic Missile Defense Organization (see MDA)
BoD	Board of Directors
BoD (ES)	Board of Directors (Executive Secretariat)
BoD (ESS)	Board of Directors (Executive Secretariat Staff)
BoOD	Board of Operating Directors
C3I	Command, Control, Communications, and Intelligence
C4I	Command, Control, Communications, Computers and Intelligence
CECOM	U. S. Army Communications and Electronics Command
CTEIP	Central Test and Evaluation Investment Program
DA	Department of the Army
DDDR&E	Deputy Director, Defense Research and Engineering
DDR&R	Deputy Director, Resources and Ranges
DIA	U. S. Defense Intelligence Agency
DoD	United States Department of Defense
DOT&E	Director of Operational Test and Evaluation
DT&E	Director, Test and Evaluation

DT&E	Developmental Test and Evaluation
DTC	Developmental Test Command
DTTSG	Defense Test and Training Steering Group
DUSA (OR)	Deputy Under Secretary of the Army for Operations Research
EA	Executive Agents
ES	Executive Secretariat
FCR	Functional Chief Representative
FMS	Foreign Materiel Sales
FY	Fiscal Year
GM	General Management
HQ	Headquarters
IOC	U. S. Army Industrial Operations Command
IPT	Integrated Product Team
JIM	Joint Improvement and Modernization
JITC	Joint Interoperability Test Command
JPO	Joint Program Office
LCSP	Life Cycle Support Plan
LFT&E	Live Fire Test and Evaluation
LOI	Letter of Instruction
MDA	Missile Defense Agency (formerly BMDO)
MEDCOM	U. S. Army Medical Command
MOA	Memorandum of Agreement

MRTFB	Major Range and Test Facility Base
OASARDA	Office of the Assistant Secretary of the Army, Research Development and Acquisition
OCOE	Office of the Chief of Engineers
ODCSINT	Office of the Deputy Chief of Staff for Intelligence
ODCSLOG	Office of the Deputy Chief of Staff for Logistics
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans
ODICS4	Office of the Director for Information Systems for Command, Control, Communications, and Computers
O&M	Operations and Maintenance
OSD	Office of the Secretary of Defense
OT	Operational Test
OTA	Operational Test Agency
OT&E	Operational Test and Evaluation
OTICC	OSD Test Investment Coordinating Committee
OTSG	Office of the Surgeon General
OUSD (A)	Office of the Under Secretary of Defense (Acquisition)
OUSD (A&T)	Office of the Under Secretary of Defense (Acquisition and Technology)
PD	Project Director
PE	Program Element
PEM	Program Element Manager
PEO	Program Executive Office
PM	Program Manager
PM, ITTS	PM, Instrumentation, Targets, and Threat Simulators
PMO	Program Management Office
PMP	Program Master Plan
POM	Program Objective Memorandum

PPBS	Planning, Programming, and Budgeting System
REP	Resource Enhancement Project
REP WG	Resource Enhancement Project Working Group
SBCCOM	U. S. Army Soldier and Biological Chemical Command
Sec Def	Secretary of Defense
SMDC	U. S. Strategic Missile Defense Command
SMP	Subproject Management Plan
SSC	U. S. Army Soldier Support Command
STRICOM	U. S. Army Simulation, Training, and Instrumentation Command
T&E	Test and Evaluation
TAACOM	U. S. Army Tank-Automotive and Armament Command
TCMP	Test Capability Master Plan
TCRD	Test Capability Requirements Document
TECOM	U. S. Army Test and Evaluation Command
TEMA	U. S. Army Test and Evaluation Management Agency
TEMAC	Test and Evaluation Managers Committee
TEMP	Test and Evaluation Master Plan
TERC	Test and Evaluation Resource Committee
TERIB	Test and Evaluation Reliance Investment Board
TIRIC	Training Instrumentation Resource Investment Committee
TIS	Test Investment Strategy
TPD	Test Package Directive
TRADOC	U. S. Army Training and Doctrine Command
TRAG	Test Resource Advisory Group
TRMP	Test Resource Master Plan
TTD&D	Test Technology Development and Demonstration

U. S.	United States
USD (AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
VCSA	Vice Chief of Staff of the Army
WG	Working Group

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LIST OF REFERENCES

1. United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Joint Improvement and Modernization Projects Planning and Executive Guide</u>, Washington, D.C.: Director, Operational Test and Evaluation, 1 September 2000.

2. United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Resource Enhancement Program Planning and Execution Guide,</u> Washington, D.C.: Director, Operational Test and Evaluation, 2000.

3. CTEIP Program Element Manager, "Central Test and Evaluation Investment Program Briefing," Washington, D.C., 12 July 2001.

4. Hinton, Derrick, "Central Test and Evaluation Investment Program," Washington, D.C., 11 October 2000.

5. United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Test Technology Development and Demonstration Project Planning and Execution Guide,</u> Washington, D.C.: Director, Operational Test and Evaluation, April 2000.

6. <u>Test and Evaluation Executive Agent,</u> [http://www.acq.osd.mil/te/pubdocs/agent.html], 9 November 2002.

7. United States Army Test and Evaluation Management Agency, [http://www.hqda.army.mil/tema/], 14 July 2001.

8. Test and Evaluation Reliance and Investment Process, [http://www.acq.osd.mil/te/pubdocs/reliance.html], 9 November 2002.

9. Greenberg, Jerald, <u>Managing Behavior in Organizations</u>, Prentice Hall: New Jersey, 1999.

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BIBLIOGRAPHY

"George Washington Chapter Sponsors Crosstalk 2002: Transforming New Technologies into T&E Capabilities," The ITEA Journal of Test and Evaluation 23.3, 2002.

Christie, Thomas P., "Interview," Interview with Robert T. Fuller and Edward G. Garza. The ITEA Journal of Test and Evaluation, September-October 2002.

CTEIP Program Element Manager, "Central Test and Evaluation Investment Program Briefing," Washington, D.C., 12 July 2001.

Director, Operational Test and Evaluation, Operational Test and Evaluation, Resources and Ranges, CTEIP, Director, Operational Test and Evaluation, [http://www.dote.osd.mil/rr/cteip.html], 14 April 2002.

Greenberg, Jerald, Managing Behavior in Organizations, Prentice Hall: New Jersey, 1999.

Hatfield, James, Chief, Technical Engineering Branch, PM Aircraft Electronic Systems, Personal Interview, 3 September 2002.

Hinton, Derrick, "Central Test and Evaluation Investment Program," Washington, D.C., 11 October 2000.

Hinton, Derrick, CTEIP PEM, DOT&E, Resources and Ranges, Telephone Interview, 5 November 2002.

Joiner, Michael, Technology Management Division, Developmental Test Command, Internet Interview, 4 December 2002.

Seglie, Ernest A., "The Future of Test and Evaluation," The ITEA Journal of Test and Evaluation 23.3, 2002.

Strohl, Suzanne, Chief, Instrumentation Division, ATEC; DOT&E REP Working Group Chairperson, Internet Interview, 22 November 2002.

Test and Evaluation Agent, [http://www.acq.osd.mil/te/pubdocs/agent.html], 9 November 2002.

Test Investment Process, [http://www.acq.osd.mil/te/pubdocs/reliance/html], 9 November 2002.

United States Army Test and Evaluation Management Agency, [http://www.hqda.army.mil/tema/], 8 October 2002 and 14 July 2001.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program 1998 Annual Report</u>, Washington D.C.: Director, Operational Test and Evaluation, 1998.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program 2001 Annual Report</u>, Washington, D.C.: Director, Operational Test and Evaluation, 2002.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Joint Improvement and Modernization Projects Planning and Executive Guide,</u> Washington, D.C.: Director, Operational Test and Evaluation, 2000.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Joint Improvement and Modernization Project Planning and Execution Guide,</u> Washington, D.C.: Director, Operational Test and Evaluation, 1998.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Resource Enhancement Program Planning and Execution Guide,</u> Washington, D.C.: Director, Operational Test and Evaluation, 2000.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Resource Enhancement Program Planning and Execution Guide,</u> Washington D.C.: Director, Operational Test and Evaluation, 1998.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Test Technology Development and Demonstration Project Planning and Execution Guide,</u> Washington, D.C.: Director, Operational Test and Evaluation, 2000.

United States, Director, Operational Test and Evaluation, <u>Central Test and Evaluation Investment Program, Test Technology Development and Demonstration Project Procedures Manual,</u> Washington D.C.: Director, Operational Test and Evaluation, 1998.

United States, House of Representatives, <u>Conference Report</u>, 101st Cong., 1st Sess., HR Rept. 101-345, Washington D.C.: U. S. Government Printing Office, 1989.

United States, House of Representatives, <u>Conference Report</u>, 101st Cong., 2nd Sess., HR Rept. 101-938, Washington D.C.: U. S. Government Printing Office, 1990.

United States, House of Representatives, <u>DoD Appropriations Bill, 1990; Report of the Committee On Appropriations</u>, 101st Cong., 1st Sess., HR Rept. 101-208, Washington D.C.: U. S. Government Printing Office, 1989.

United States, House of Representatives, <u>DoD Appropriations Bill, 1991; Report of the Committee On Appropriations</u>, 101st Cong., 2nd Sess., HR Rept. 101-822, Washington D.C.: U. S. Government Printing Office, 1990.

United States, Senate, <u>DoD Appropriation Bill, 1990; Report from the Committee on Appropriations,</u> 101st Cong., 1st Sess., S Rept. 101-132, Washington, D.C.: U. S. Government Printing Office, 1989.

United States, Senate, <u>DoD Appropriation Bill, 1990; Report from the Committee on Appropriations,</u> 101st Cong., 2nd Sess., S Rept. 101-521, Washington, D.C.: U. S. Government Printing Office, 1990.

Wagner, Ray, Director of Resources, U.S. Army Test and Evaluation Management Agency, Telephone Interview, 8 November 2002.

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